TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

OK

August 9, 2004

TO: Internal File

THRU: Joseph C. Helfrich, Environmental Scientist III, Biologist & Team Lead

FROM: Steve Fluke, Reclamation Hydrogeologist SFL

RE: South Crandall Lease Revision, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task ID #1945

SUMMARY:

Genwal Resources, Inc. (Genwal) has submitted an application to the Division of Oil, Gas and Mining (the Division) requesting a modification of their mining and reclamation plan to include the South Crandall Federal Lease (UTU-78953) and a 40-acre parcel of land that is being subleased from SITLA/PADCIFICORP. The Division has reviewed the application and responses to deficiencies three times previously. The latest response, submitted by Genwal on June 14, 2004, was assigned Task #1945. In addition to addressing the Division's list of deficiencies, Genwal's latest response addresses some of the comments from the Manti-La Sal Forest Service.

This memo addresses the hydrology section of the response to the deficiencies. Hydrology related deficiencies from the previous Technical Memo (Task ID #1903) include:

R645-301-724.100, the Permittee needs to obtain current groundwater rights information in and adjacent to the permit boundary from the Utah Division of Water Rights to update Appendix 7-1.

R645-301-724.200, the Permittee needs to obtain current surface water rights information in and adjacent to the permit boundary from the Utah Division of Water Rights to update Appendix 7-1.

R645-301-752.240, the permittee needs to provide a copy of the agreement between Genwal and Castle Valley Special Service District regarding mitigation for

dimunition to or degradation of the quality or quantity of Little Bear Spring to be included in the plan or made a stipulation for DOGM permitting.

The information reported in the response addresses these deficiencies and meets the minimum hydrologic requirements of the Regulations. However, new deficiencies have arisen related to the uncertainty of the locations and elevations of the springs documented in the Little Bear Canyon watershed. The proposed amendment should not be approved at this time.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

The existing climatological information presented in the Crandall Canyon Mine M&RP is also representative of the South Crandall lease area and the additional 40-acre sublease area. Average seasonal precipitation, average direction of prevailing winds, and seasonal temperature ranges are all presented in Section 7.24.4 Climatological Information.

Findings:

The information reported meets the minimum climatological requirements of the Regulations.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The permittee has added four spring and six stream monitoring locations to their existing water monitoring program. As stated in Section 7.2 Sampling and Analysis of the mines existing M&RP, "all water samples are collected and analyzed according to methods in either the "Standard Methods for the Examination of Water and Waste Water" or the 40 CFR parts 136 and 434".

Baseline Information

A description of the hydrologic and geologic characteristics of the South Crandall lease area and the additional 40-acre sublease area has been added to Section 7.24.1 Groundwater Information and Section 7.24.2 Surface Water Information. Geologic characteristics of the lease area have also been included in Chapter 6. Baseline information of the premining groundwater and surface water features within and adjacent to the lease area is included as Appendix 7-58 Summary of Hydrologic Baseline Information, South Crandall Lease Area. Appendix 7-58 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1980. Little Bear Spring and Little Bear Canyon Creek have been monitored since 1957 and 1970, respectively. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site. Major ion, trace metal, and nutrient water quality data collected by Genwal in June and August, 2003, are also presented for the four springs and six surface water monitoring sites to be included in the Genwal water monitoring program for the South Crandall lease area and the additional 40-acre sublease area.

Supplemental hydrologic information has been added as Appendices 7-52 through 7-57, and 7-59 through 7-62 to address the complex hydrogeology of Little Bear Spring. Little Bear Spring is an important municipal water source and is located approximately 1,000 feet south of the South Crandall Lease Area in Little Bear Canyon. These appendices are scientific studies that describe, among other things, the groundwater systems encountered in the Crandall Canyon mine, their relation to Little Bear Spring, and the potential source of water for the spring. The studies indicate that Little Bear Spring is recharged primarily through surface water and alluvial groundwater losses in Mill Fork Canyon.

The listing of water rights in and adjacent to the permit boundary, as obtained from the Utah Division of Water Rights, has been updated on the groundwater and surface water rights maps (Plates 7-14 and 7-15, respectively), the tabulated listing of surface water rights (Table 7-6), and the supporting water rights information (Appendix 7-1).

Baseline Cumulative Impact Area Information

The Division needs to update the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon lease tract and the SITLA/Pacificorp sublease tract. Hydrogeologic information provided by the amendment is adequate for the Division to complete this update.

Modeling

A conceptual recharge model of Little Bear Spring is presented as Appendix 7-55 Investigation of the Potential for Little Bear Spring Recharge in Mill Fork Canyon, Emery County, Utah. The model uses information obtained from studies presented in other appendices including two isotopic studies, an in-mine slug tests, a resistivity study, hydrogeologic information, and historical flow data. In addition, a dye tracing study and three electromagnetic (AquaTrack) studies of the Little Bear Spring recharge system are presented in the appendices. Combined, these studies make a compelling argument that the primary source of recharge to Little Bear Spring is through surface water and alluvial groundwater losses in Mill Fork Canyon.

Probable Hydrologic Consequences Determination

The Probable Hydrologic Consequences Determination (PHC) (Appendix 7-15) has been updated to include the hydrologic, geologic, baseline, and supplemental information provided for the South Crandall lease area and the additional 40-acre sublease area. Updates in the PHC center around the recharge source to Little Bear Spring and the potential impacts of the proposed mine workings on the spring. Studies indicate that fractures in the Star Point Sandstone act as a conduit to provide surface and alluvial water from Mill Fork Canyon to Little Bear Spring. Because this fracture system lies outside of the South Crandall Lease permit boundary, and a regional Star Point aquifer does not contribute to the fracture system, then it is considered extremely unlikely that the proposed mining activities will impact the spring. In addition, the Star Point Formation will not be undermined by the proposed mining in the South Crandall Lease Area because the coal seams proposed for mining are stratigraphically above the Star Point Formation.

Groundwater Monitoring Plan

The existing groundwater monitoring plan has been updated to include the monitoring of four springs located within and adjacent to the South Crandall lease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 1,000 feet outside of the lease area; site LB-2 that discharges from the Castlegate Sandstone at the south end of the lease area; site LB-5A that discharges from a sandstone channel in the Blackhawk Formation

overlying mining operations at the south end of the lease area; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the M&RP.

Surface-Water Monitoring Plan

The existing surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area as shown on Plate 7-18. The creeks to be monitored include: the intermittent Little Bear Canyon Creek, the ephemeral drainage in SW ¼ of Section 4 T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6 T16S R7E, and the intermittent creek in Section 5 T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Little Bear Canyon Creek and Section 4 Creeks will be monitored approximately 100 feet above their confluence with Huntington Creek, the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek, and Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the M&RP.

Findings:

The information reported meets the minimum requirements for hydrologic resource information of the Regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Monitoring and Sampling Location Maps

Plate 7-12 shows the seep and spring locations for the Crandall Canyon mine and surrounding area. The baseline seep and spring locations for the South Crandall lease area and the additional 40-acre sublease area are shown on this plate as well as in Appendix 7-58. In addition, Plate 7-12 shows the locations of the spring monitoring sites as identified in Section 7.31.21, Groundwater Monitoring Plan, and Table 7-10. Little Bear Spring (LB-11) has been identified as a monitoring site on Plate 7-12. Surface and groundwater monitoring locations for the South Crandall lease area and the additional 40-acre sublease area are shown on an updated map in Plate 7-18.

Based on recent site visit and discussions with representatives of the Permittee, the Manti-La Sal Forest Service, and the BLM, it has come to our attention that the springs in the Little Bear Canyon watershed as shown on Plate 7-12 and Plate 7-18 are not mapped accurately. In fact, it appears that Spring LB-5a as shown on these plates may not be the actual spring that has been monitored for the baseline monitoring since 1997. This is significant because it has created confusion while interpreting Special Lease Stipulation No. 9 for the R2P2. Special Lease Stipulation No. 9 concerns, among other things, subsidence in the Little Bear Canyon area with overburden less than 600 feet.

In order to clarify the locations of significant springs in relation to the geology and longwall mining projections in Little Bear Canyon watershed, the Division requires a topographic map of the Little Bear Canyon watershed be provided showing the following:

- Surveyed locations and identity of all significant springs;
- The Hiawatha and Blind Canyon seam outcrop contours;
- The Blind Canyon seam 600-foot overburden contour;
- The Hiawatha and Blind Canyon seam mining projections; and
- Surface geology.

In addition, any changes of the identity and/or locations of the springs should be accurately represented in the text and Plates 7-12 and 7-18.

Subsurface Water Resource Maps

Plate 7-13, Potentiometric Surface of Spring Canyon Member, Star Point Sandstone, is referenced in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater, of the existing and revised M&RP. The plate should not be removed from the M&RP, nor does it need to be updated to include the South Crandall lease area, as stated in the Division's first Technical Analysis, dated December 2, 2003 (Task ID #1698). No subsurface water resource map is included for the South Crandall lease area or the additional 40-acre sublease area.

Plate 7-14, Groundwater Rights, has been updated to include the South Crandall lease area and the additional 40-acre sublease area.

Surface Water Resource Maps

Plate 7-15, Surface Water Rights, has been updated to include the South Crandall lease area and the additional 40-acre sublease area.

Plate 7-16, Stream and Monitoring Stations, is referenced in Section 7.24.1, Groundwater Information, Mine Plan Area Surface Hydrology, of the existing and revised M&RP. The plate should not be removed from the M&RP, nor does it need to be updated to include the South Crandall lease area, as stated in the Division's first Technical Analysis, dated December 2, 2003 (Task ID #1698).

Well Maps

No water monitoring wells are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Findings:

Maps, Plans, and Cross Sections of Resource Information are not sufficient to meet the requirements of the Coal Mining Rules. Before the proposed amendment can be approved, the Permittee needs to provide the following information:

R645-301-722.300, the Permittee needs to provide a detailed hydrologic map of the Little Bear Canyon watershed showing geology and mining projections as described above.

R645-301-722.300, the Permittee needs to update any changes of the identity and/or locations of springs within the Little Bear Canyon watershed to be accurately represented in the text and Plates 7-12 and 7-18.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Groundwater Monitoring

The existing groundwater monitoring plan has been updated to include the monitoring of four springs located within and adjacent to the South Crandall lease area and the additional 40-acre sublease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 1,000 feet outside of the lease area; site LB-2 that discharges from the Castlegate Sandstone at the south end of the lease area; site LB-5A that discharges from a sandstone channel in the Blackhawk Formation overlying mining operations at the south end of the lease area; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the M&RP.

As a stipulation of the lease agreement (Special Coal Lease Stipulation #17), the permittee has committed to mitigate for potential disruption to Little Bear Spring through the construction of a water treatment plant. This plant is to be constructed under the provisions of a water treatment plant agreement between Genwal, Pacificorp, and the Castle Valley Special Service District. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51.

Surface Water Monitoring

The existing surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area and the additional 40-acre sublease area as shown on Plate 7-18. The creeks to be monitored include: the intermittent Little Bear Canyon Creek, the ephemeral drainage in SW ¼ of Section 4 T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6 T16S R7E, and the intermittent creek in Section 5 T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Little Bear Canyon Creek and Section 4 Creeks will be monitored approximately 100 feet above their confluence with Huntington Creek, the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek, and Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the M&RP.

Acid- and Toxic-Forming Materials and Underground Development Waste

The existing M&RP has not been updated for the South Crandall lease area or the additional 40-acre sublease area. If waste rock is generated, the mine has committed to a program of testing the waste rock for acid- or toxic-forming materials. If such materials are identified, then the waste rock will be contained prior to proper disposal.

Transfer of Wells

Transfer of wells is not currently considered. Any future transfers will be in accordance with DOGM approval.

Discharges Into An Underground Mine

There are no planned discharges into underground mines for the South Crandall lease area or the additional 40-acre sublease area.

Gravity Discharges From Underground Mines

There are no gravity discharges currently planned from the South Crandall lease area or the additional 40-acre sublease area. No mention specifically regarding discharge from the lease areas are made. The mine must obtain a NPDES permit for any water discharge from the lease areas.

Water-Quality Standards And Effluent Limitations

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Diversions: General

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Diversions: Perennial and Intermittent Streams

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Diversions: Miscellaneous Flows

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Stream Buffer Zones

No underground mining within 100 feet of a perennial stream is proposed for the South Crandall lease area or the additional 40-acre sublease area.

Sediment Control Measures

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Siltation Structures: General

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Siltation Structures: Sedimentation Ponds

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Siltation Structures: Other Treatment Facilities

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Siltation Structures: Exemptions

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Discharge Structures

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Impoundments

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Ponds, Impoundments, Banks, Dams, and Embankments

No new disturbed surface areas are proposed for the South Crandall lease area or the additional 40-acre sublease area.

Findings:

The information reported meets the minimum requirements for the hydrologic information section of the Regulations.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

No update to the existing hydrologic reclamation plan was submitted because no new surface disturbance is planned for the South Crandall lease area or the additional 40-acre sublease area.

Findings:

The permittee has submitted sufficient information to address this section.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The Division needs to update the East Mountain Cumulative Hydrologic Impact Assessment (CHIA) to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon lease tract and the SITLA/Pacificorp sublease tract. Hydrogeologic information provided by the amendment is adequate for the Division to complete this update.

Findings:

The information reported meets the minimum CHIA requirements of the Regulations.

RECOMMENDATIONS:

The proposed amendment should not be approved at this time. Additional hydrologic information is needed to meet the requirements of the Coal Mining Rules.

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